Table of Contents

List of Figures

Purpose

The purpose of this documentation is to cover details of the cadastral and ground audit data which has been incorporated into the Christmas Island GIS. These details include the process by which the data was attached to map polygons, discussion on the data and some examples of graphics and tables generated from the data.

It also serves as a store of associated detail about the cadastral data, e.g. listings of the data as received, documentation provided with the data by DOLA or AUSLIG.

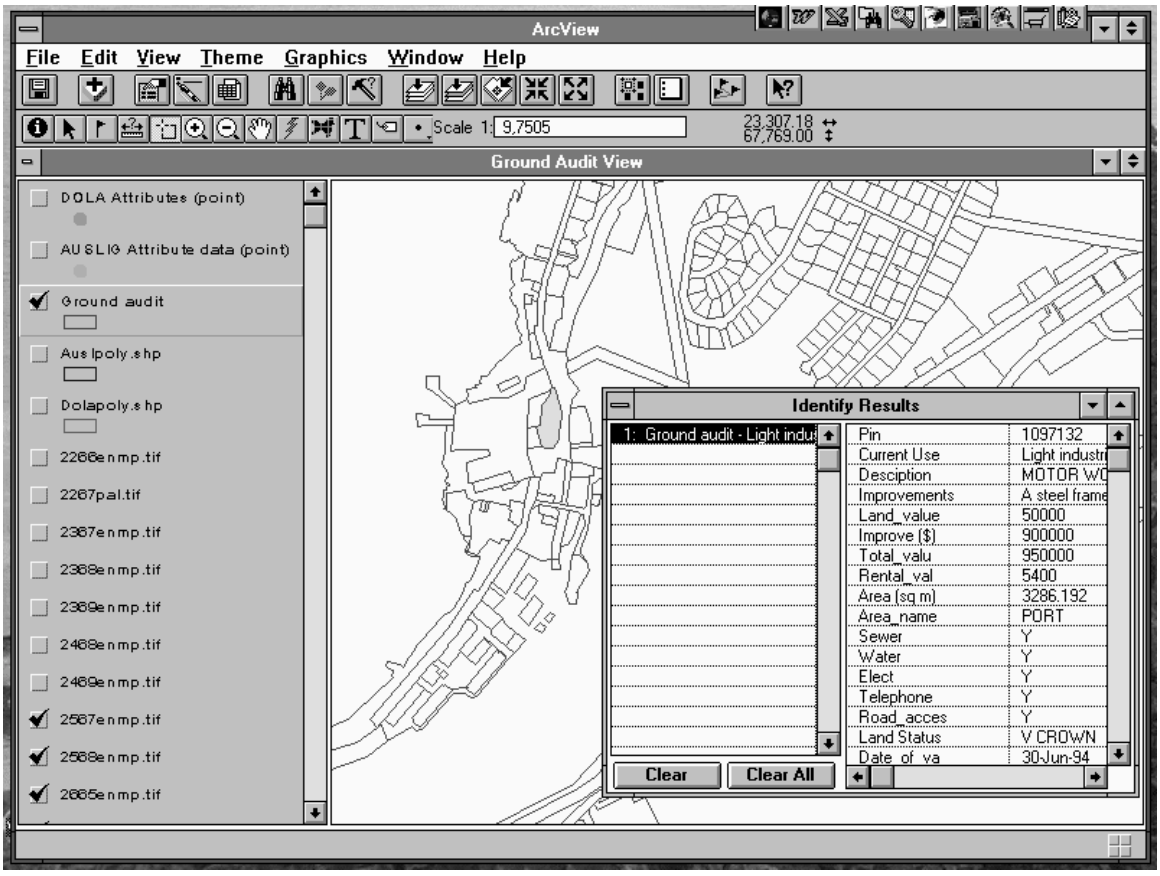

Fig. 1. Ground Audit attributes of selected polygon (light grey).

Introduction

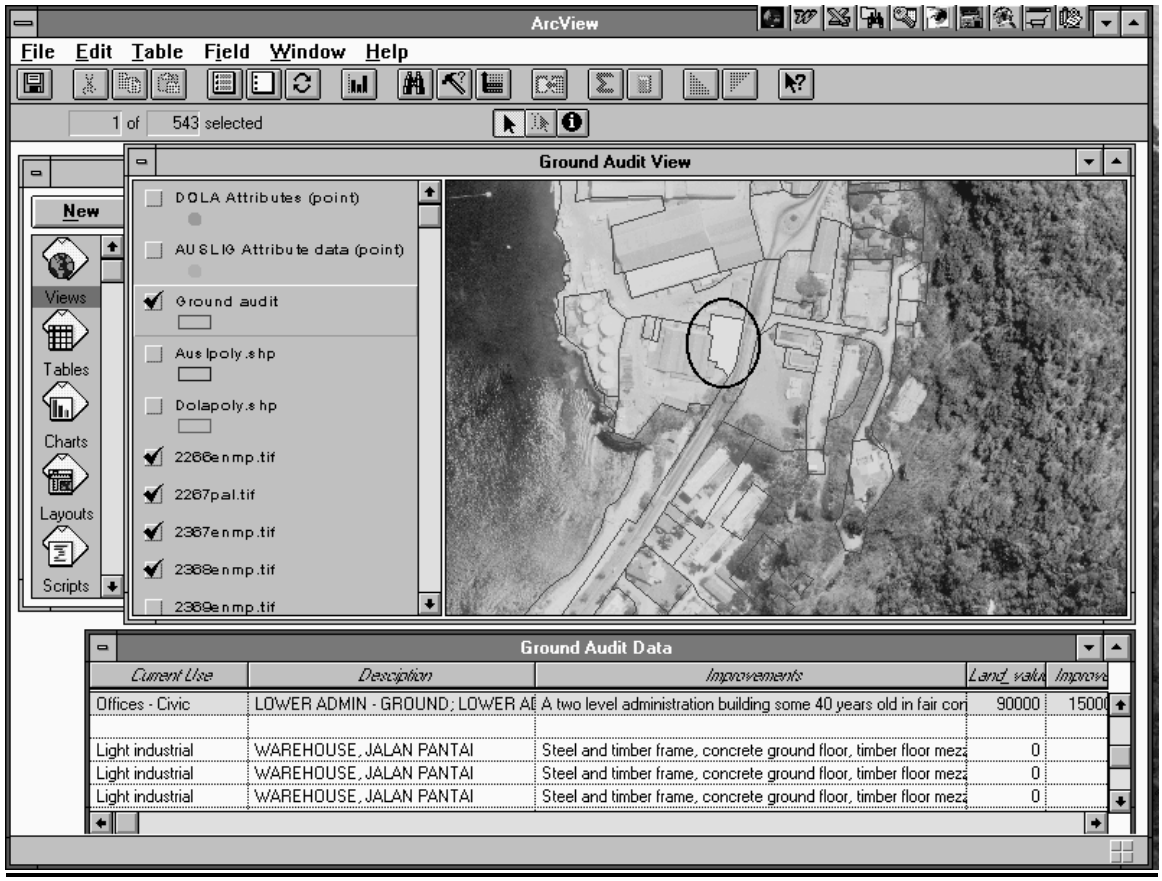

Fig 2. Main project view: Selected building (circled) linked to data in the lower table (top record).

The Ground Audit Icon

The Ground Audit icon runs a custom built *ArcView* project file. The Ground Audit project file presents cadastral information in the form of a working *ArcView* project. It displays the cadastral data when a point of interest on Christmas island is visually selected with the mouse.

The Ground Audit project contains several theme options which can be selected for display. The most relevant is the composite theme 'Ground Audit' which contains the AUSLIG polygons joined to the table of Ground Audit data and AUSLIG points data. This theme allows the selected field data on the table and matching polygon on the map to be highlighted and displayed simultaneously, allowing queries either by visual selection or by field attributes. The information cursor can also be used to bring a separate data table on a selected polygon.

The 'Ground Audit' shape file is actually stored as 'gndaud1.shp'. It was renamed for display recognition purposes after matching up all the data correctly.

The other themes included are the basic DOLA and AUSLIG polygon sets and the AUSLIG attribute data points. These are useful for reference and comparison, but normally are switched off to avoid concealing details and speed up the map updates.

Underlying the lines and points are the orthophotographs, providing real visual images of sections of the island. These photos differ from regular aerial photos because the of removal of the normal lens distortion associated with aerial photographs. The usual distortion factor would cause inconsistencies when relating the overlying lease polygon boundaries.

AUSLIG Polygon Data

The data is linked to a set of GIS polygons processed by **AUSLIG**. For comparison, there is a set of polygons produced by **DOLA** (Department of Lands Admin., WA). These can be overlayed on the series of aerial Orthophotos in the data set which have been corrected for lens distortion.

Ground Audit Data

The cadastral data included is known as the Ground Audit Data, which was released by AUSLIG as a *Microsoft Access v2.0* database file table and report. This information was processed, checked and spatially attached to the relevant AUSLIG polygons where possible using a set of AUSLIG points which intersected the polygons.

The number of data fields attached to the polygons is quite large and some of the fields will not necessarily be of interest to most people. The more important fields of reference and possible interest have been placed at the front of the tables.

The first data fields in the Ground Audit table are the PIN number, current use, description, improvements, area (sq. m), perimeter (m) and area name. After these are more fields of interest followed by the rest of the fields which have mostly been left in the original order.

CIGIS ground audit data: 'Current use' field.

Fid	Current Use	Description	Improvements
1096903	Oil storage	Fuel Farm, Gaze Road	Two fuel tanks only.
1096842	Oil storage - Fuel Far	FUEL FARM, SMITH POINT	A small brick pump station and three fuel tanks.
1097095	PUBLIC Recreation Base	Golf Club House	
1096870	Port operations	Port Facilities Jalan Pantai	
1096895	Port operations	Port Facilities - Jalan Pantai	Phosphate loading cantilevers

The following table contains the ground audit data fields listed in the same order as at the start of the Ground Audit table. The table below lists the number of non-blank records attached to the 543 Auslig polygons from each data field. The figures were obtained by using the query option to select and count the number of records from each field. The percentage gives an easier interpretation of the the data coverage over the polygons.

Field	Count /543	%
Pin >0	438	81%
Current Use	288	53%
Description	275	51%
Improvements	143	26%
Land value $>0	107	20%
Improvements $>0	52	10%
Total value $>0	147	27%
Rental value $>0	54	10%
Area name	389	72%
Sewer =y	352	65%
Water =y	355	65%
Electricity =y	354	65%
Telephone =y	425	78%
Land status	438	81%
Locality	280	52%

Table 1: Count of field records attached to the AUSLIG polygons.

Almost all of the field names are abbreviated. Some of the important ones have had an alias name attached to make the field understandable. An alias can be created when the Table Properties menu is selected. In Appendix 5, there is a dictionary of the field name meanings used by DOLA.

Data Layer Descriptions

Ground Audit Layer

The main data layer created for use in the Ground Audit View is a composite consisting of the AUSLIG polygons, AUSLIG attribute data points and the table of Ground Audit data.

The Ground Audit data was joined to the Data Points first and then the Data Points were joined spatially to the polygons. The theme has been labelled as **Ground audit**, as seen below.

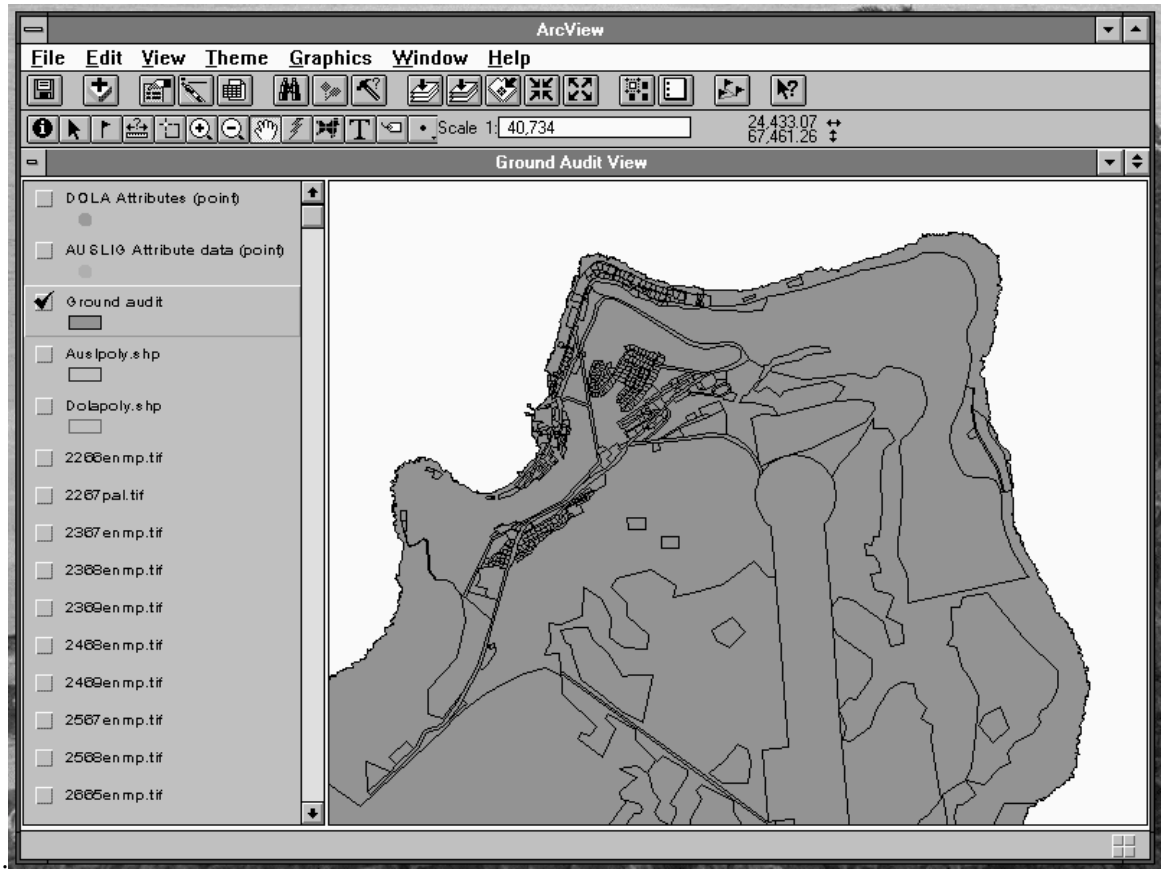

Fig. 3. Ground Audit theme consisting of AUSLIG polygons and Ground Audit data

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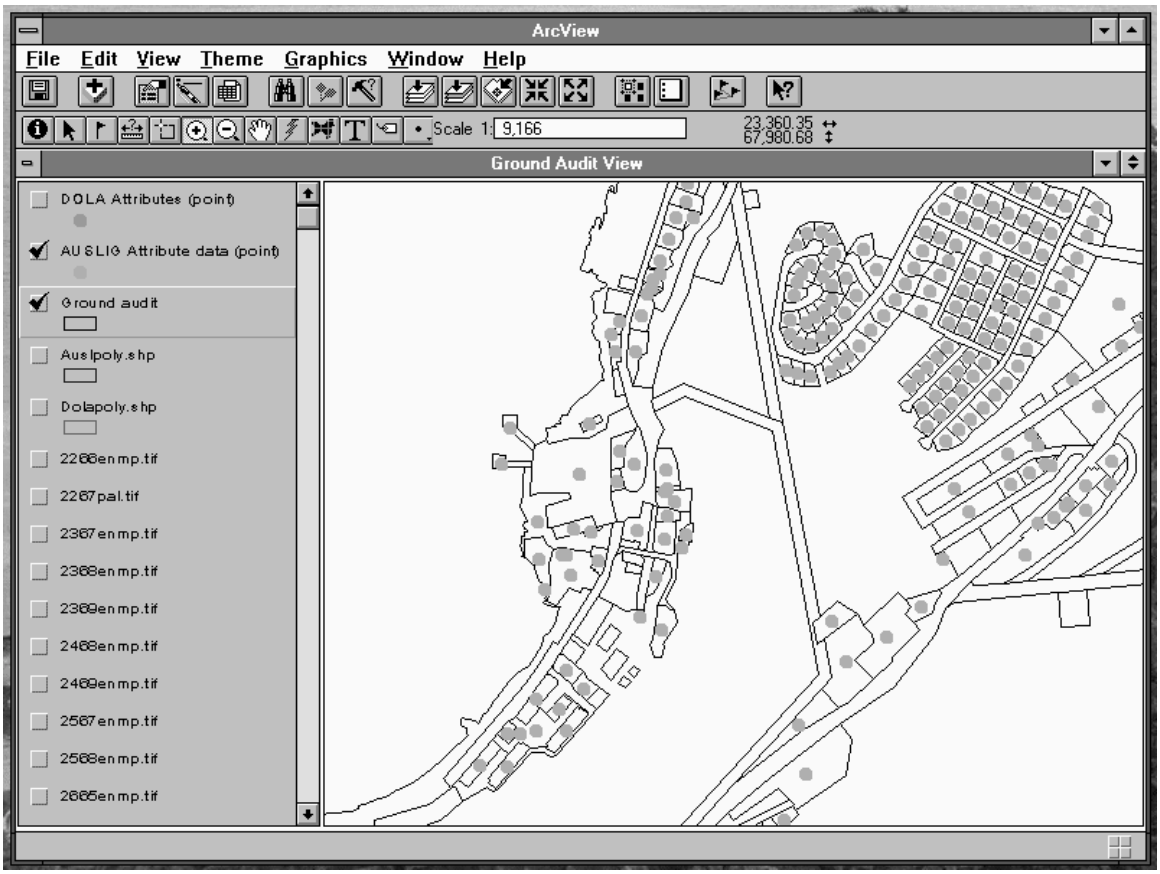


Fig. 4. AUSLIG points used to join AUSLIG polygons to Ground Audit data.

Using the Ground Audit Data

Querying the Data

The ground audit data can be easily queried in *ArcView 2.1a*. Open the 'Ground Audit' data table or select the **Table** button while in the **View** window [Ground Audit View] and then select the **Query** option.

This brings up a small table which lists various logic functions and the list of fields in the data set. There is also a table which displays your selection criteria based on functions and selected fields. This table can be used repetitively to focus in on specific information and narrow down the list of selected records which will be highlighted in yellow in the main table. The map polygons on the View frame will also be highlighted in yellow, corresponding to the selected records when the shape file table is being used. This is demonstrated in the *ArcView* screen shot below. The light grey portions of the island represent the yellow high-lighted polygons.

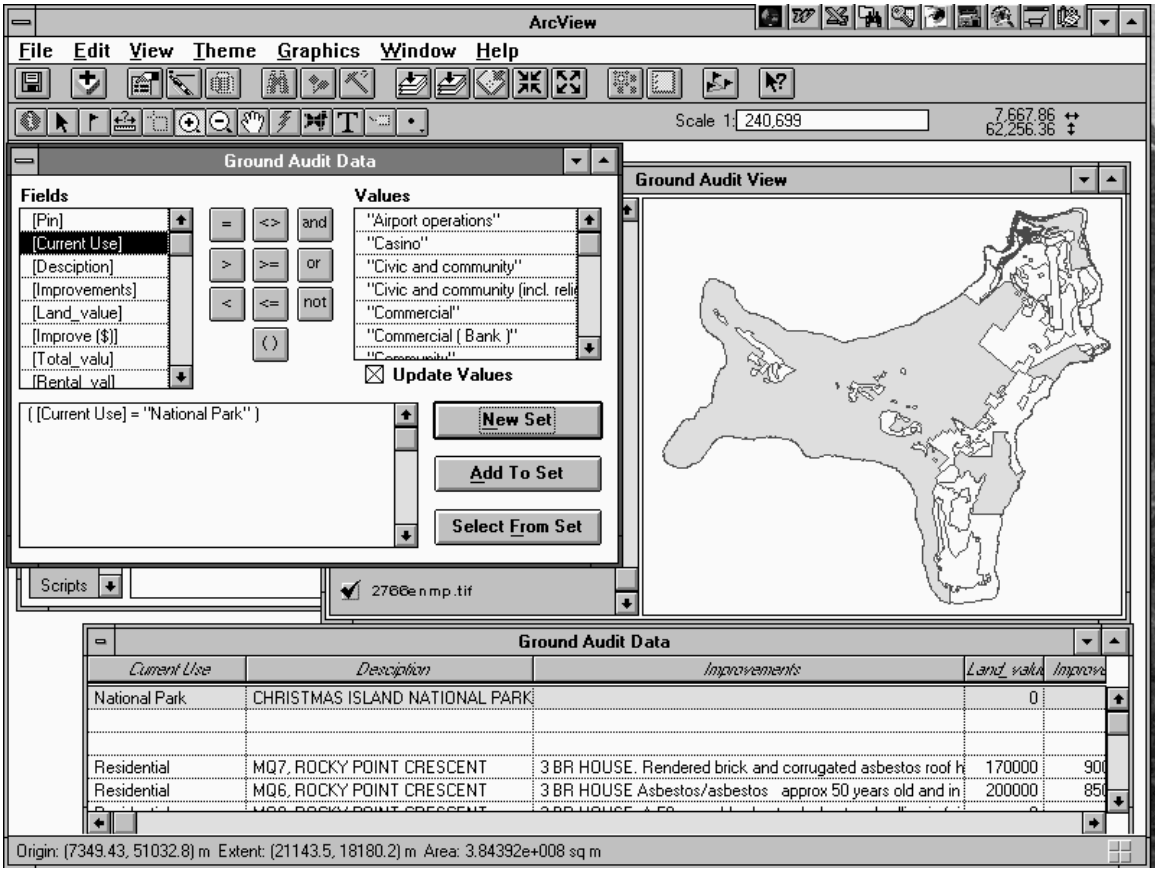
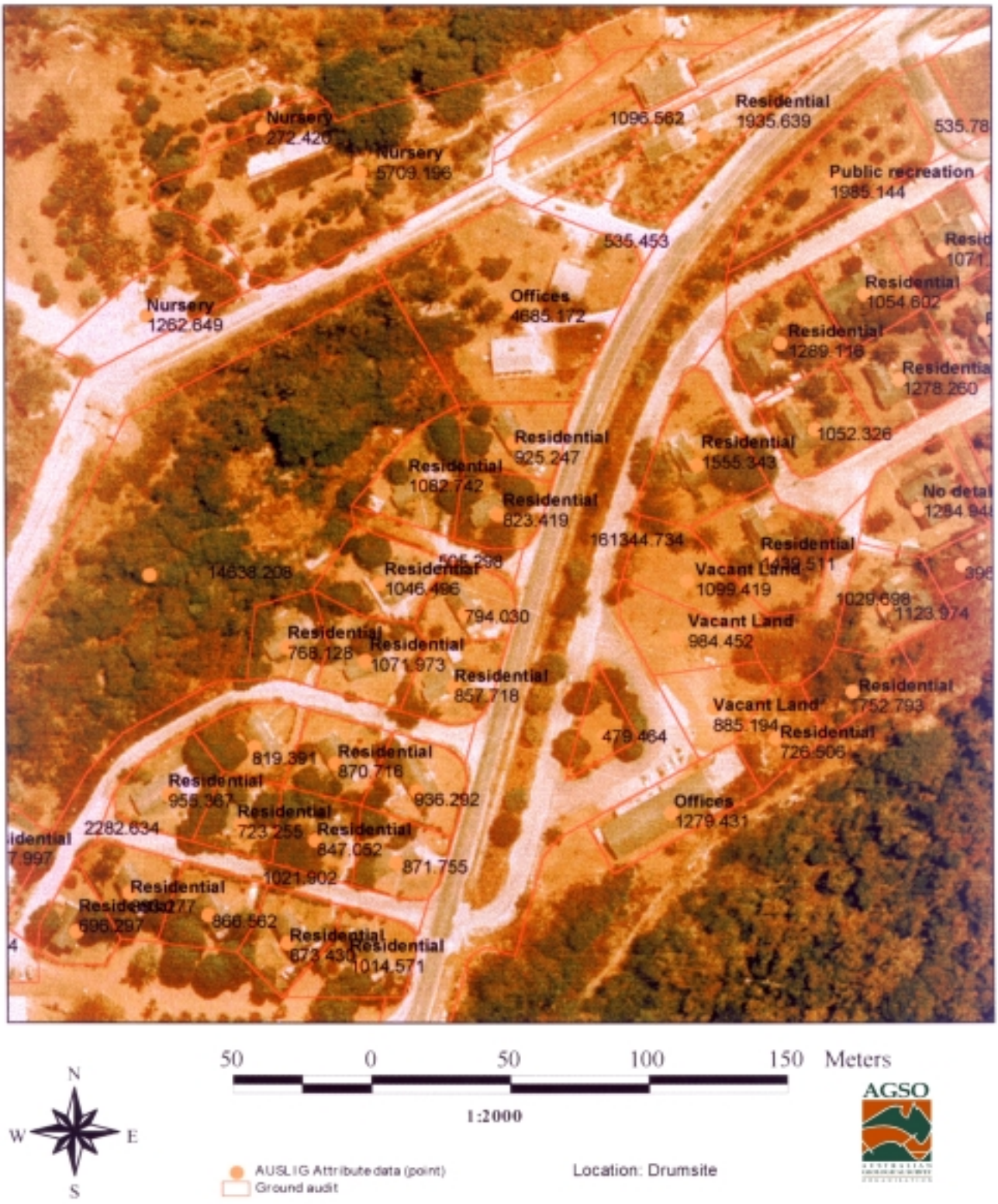


Fig. 5. Screenshot of Query options. National Park Coverage (light grey).

CIGIS ground audit data: 'Current use' and 'Area (sq.m)' fields.



PIN	Current Use	Description	Improvements
1098816	Residential	MQ743	
1098815	Residential	MQ742	
1128872	Vacant Land	Abbotts Nest	
1162655			
1128873	Residential	VACANT LAND, ABBOTTS NEST	3 BR HOUSE. Hardiplank/metal deck, 12 months old.

Statistics and Charts

Because there is a great number of fields in the data base, a good option is to select a field of particular interest and use the **Summarise** tool. This allows you to then select the related fields you are interested in and display statistics on them as a separate table. Below is a screen shot of the **summarise** table.

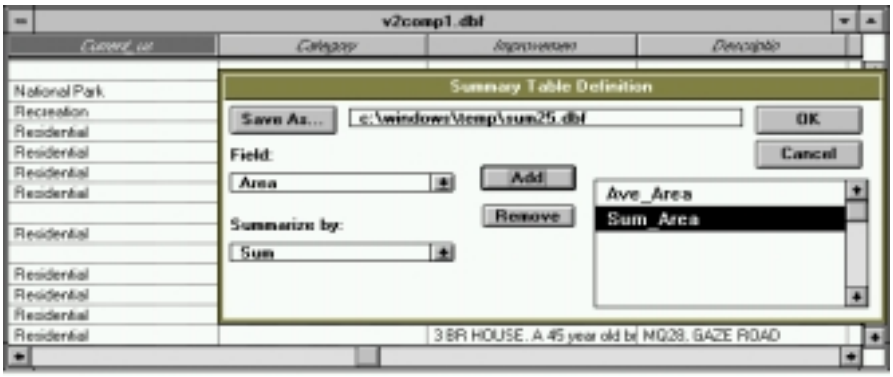


Fig. 6. Summary Table.

The resultant table contains only the relevant data of interest complete with desired statistics. From this point the information can be used to create a chart or left as is.

Another step which can be taken before summarising data is to select records using the **Query** option and then proceed further.

The figure on the next page shows a selection process where only records containing properties described as **'Residential'** were selected. Then the selected records were summarised using the **Locality** field to list the average Land and Total Values of the residential properties. The table was then used to create a bar chart of the information.

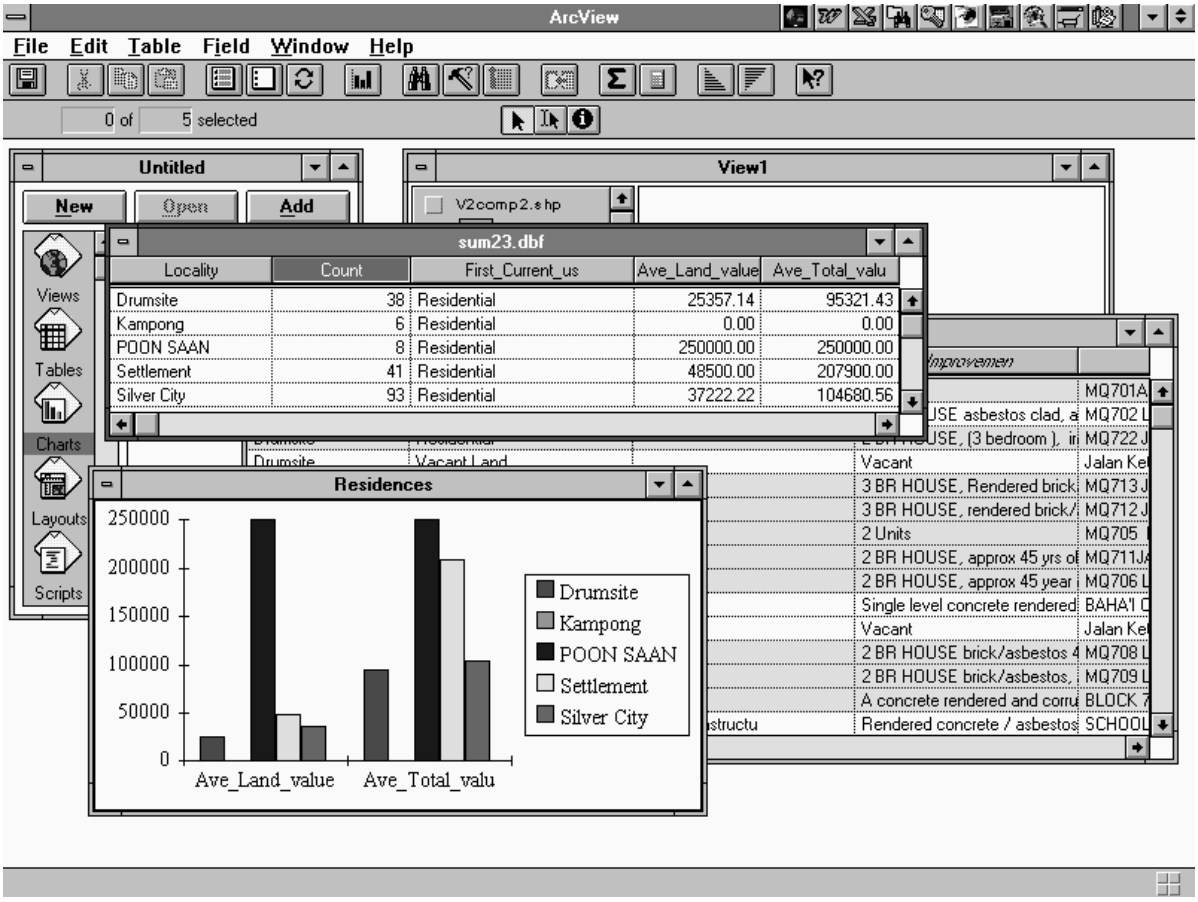


Fig. 7. Summary Table and Chart of Residential Properties.

Ground Audit Data

Summarised Data: "Current Use" Field

CURRENT_USE	COUNT	SUM_AREA (Hectares)	SUM_LAND VALUE	SUM_IMPRO VEMENTS	SUM_TOTAL VALUE
Airport operations	1	171.05	$0	$1,600,000	$1,600,000
Casino	1	47.23	$100	$0	$100
Civic and community	1	0.12	$100,000	$690,000	$790,000
Civic and community (incl. religious	1	0.03	$3,000	$0	$3,000
Commercial	1	0.76	$0	$0	$0
Commercial (Bank)	1	0.03	$30,000	$0	$30,000
Community	6	0.66	$274,000	$930,000	$1,204,000
Community - Hospital	1	4.00	$145,000	$0	$145,000
Eating and drinking places	2	0.34	$0	$0	$435,000
Education	3	3.98	$197,500	$2,861,500	$3,059,000
Industry	7	22.78	$560,000	$750,000	$1,310,000
Light industrial	12	2.87	$157,000	$1,208,000	$1,415,000
Local community facilities - Kinderg	1	0.08	$8,000	$20,000	$28,000
Local community facilities - Women's	1	0.05	$5,000	$45,000	$50,000
National Park	4	8743.49	$0	$0	$0
No details available	1	0.13	$0	$0	$12,000
Nursery	3	0.72	$0	$0	$0
Offices	3	0.65	$117,500	$130,000	$247,500
Offices - Civic	1	0.09	$90,000	$1,500,000	$1,590,000
Oil storage	2	0.35	$51,000	$10,000	$61,000
Oil storage - Fuel Farm	1	0.24	$20,000	$0	$20,000
PUBLIC Recreation Reserve - Golf clu	1	0.36	$0	$0	$0
Port operations	3	2.09	$0	$0	$0
Public recreation	4	1.71	$0	$0	$0
Public recreation - Golf Course	2	16.97	$0	$0	$0
Public recreation - Reserve	3	0.37	$0	$0	$0
Recreation	1	0.07	$70,000	$32,500	$102,500
Religious purposes	3	0.32	$35,000	$0	$35,000
Residential	185	27.92	$3,400,000	$2,149,500	$11,530,000
Residential (Vacant)	1	0.17	$0	$0	$60,000
Restaurant	2	0.14	$30,000	$18,750	$48,750
Shops	1	0.18	$70,000	$550,000	$620,000
Shops, markets	1	0.02	$0	$0	$75,000
Supermarket	1	0.21	$170,000	$1,080,000	$1,250,000
Telephone Exchange/Residential	1	0.17	$70,000	$30,000	$100,000
Unknown	2	0.20	$13,000	$38,000	$51,000
Vacant Land	19	3.97	$911,000	$0	$910,000
Vacant land	4	2.47	$0	$0	$0
	208	4379.87	$0	$0	$0

Table 2: Summary data of the current use of leases on the island.

Note: The database still has gaps in it as seen in the table.

Residential Lease Sizes and Values

The following table and charts contain the statistical details of residential leases in different area localities across the island.

The data was selected through a query of the main table for all “Residential” records and then summarised using the “AREA_NAME” field.

Bar charts were produced directly from the summary, but the Pie chart was produced in *Excel* by exporting the summary data.

AREA_NAME	COUNT	AV AREA (sq m)	SUM AREA (sq. m)	AVE_ AREA (ha)	SUM AREA (ha)	AVE_ LAND VALUE	SUM LAND VALUE
CENTRAL TERRACES	8	4988	39908	0.50	3.99	$31,250	$250,000
DRUMSITE	37	1035	38289	0.10	3.83	$9,595	$355,000
FLYING FISH COVE	6	1518	9108	0.15	0.91	-	-
GAZE ROAD	5	1147	5734	0.11	0.57	-	-
PORT	3	1693	5079	0.17	0.51	$15,000	$45,000
SETTLEMENT	33	1885	62191	0.19	6.22	$42,727	$1,410,000
SILVER CITY	93	1074	99871	0.11	9.99	$14,409	$1,340,000

Table 3: “Area Name” summary data.

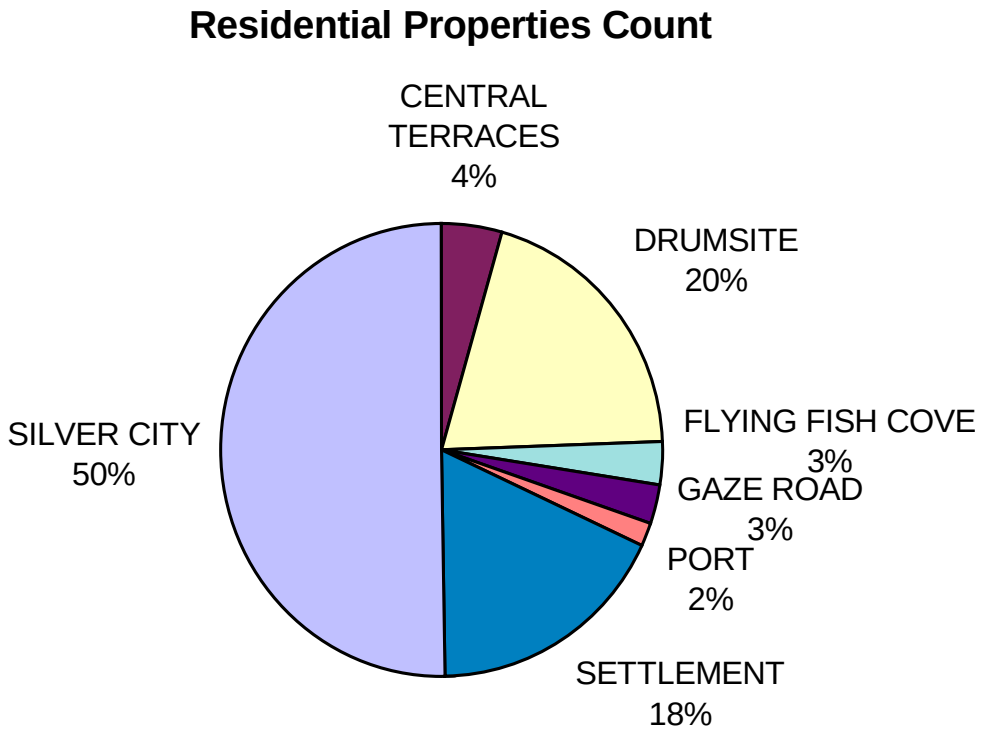


Fig. 8. Percentage count of Residential leases in Localities.

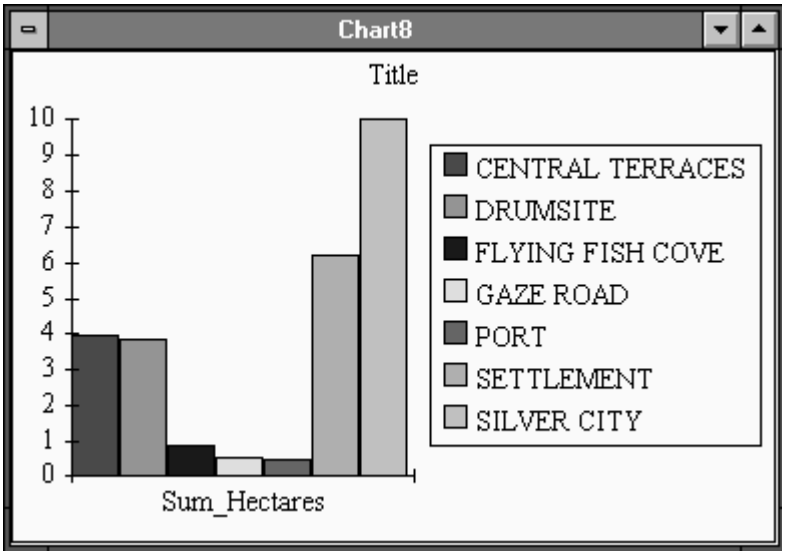


Fig. 9. Sum Area (ha) of Residential Leases

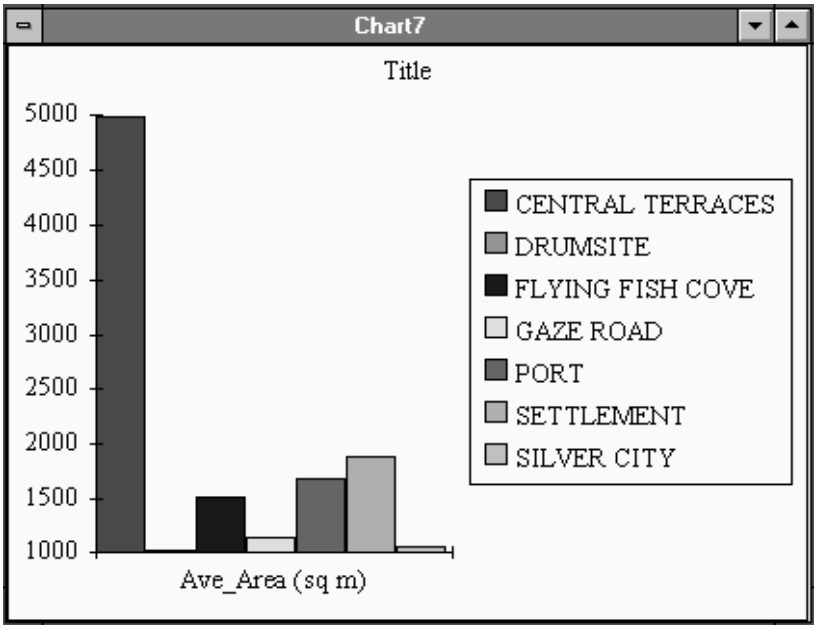


Fig 10. Average Size (sq. m) of Residential Leases

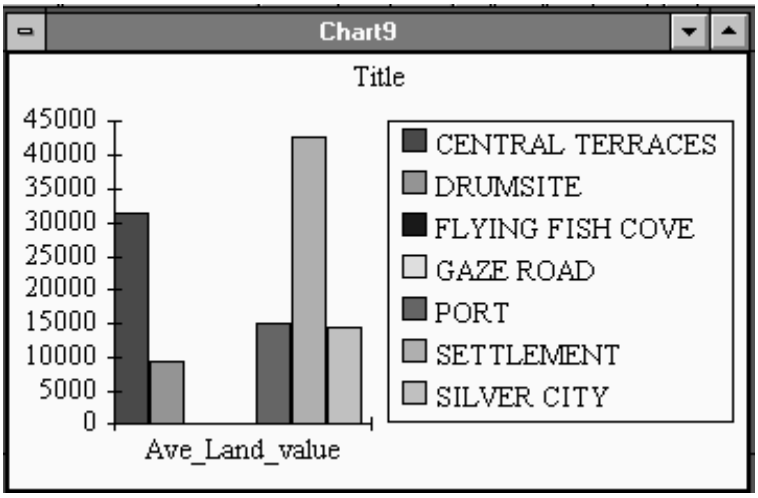
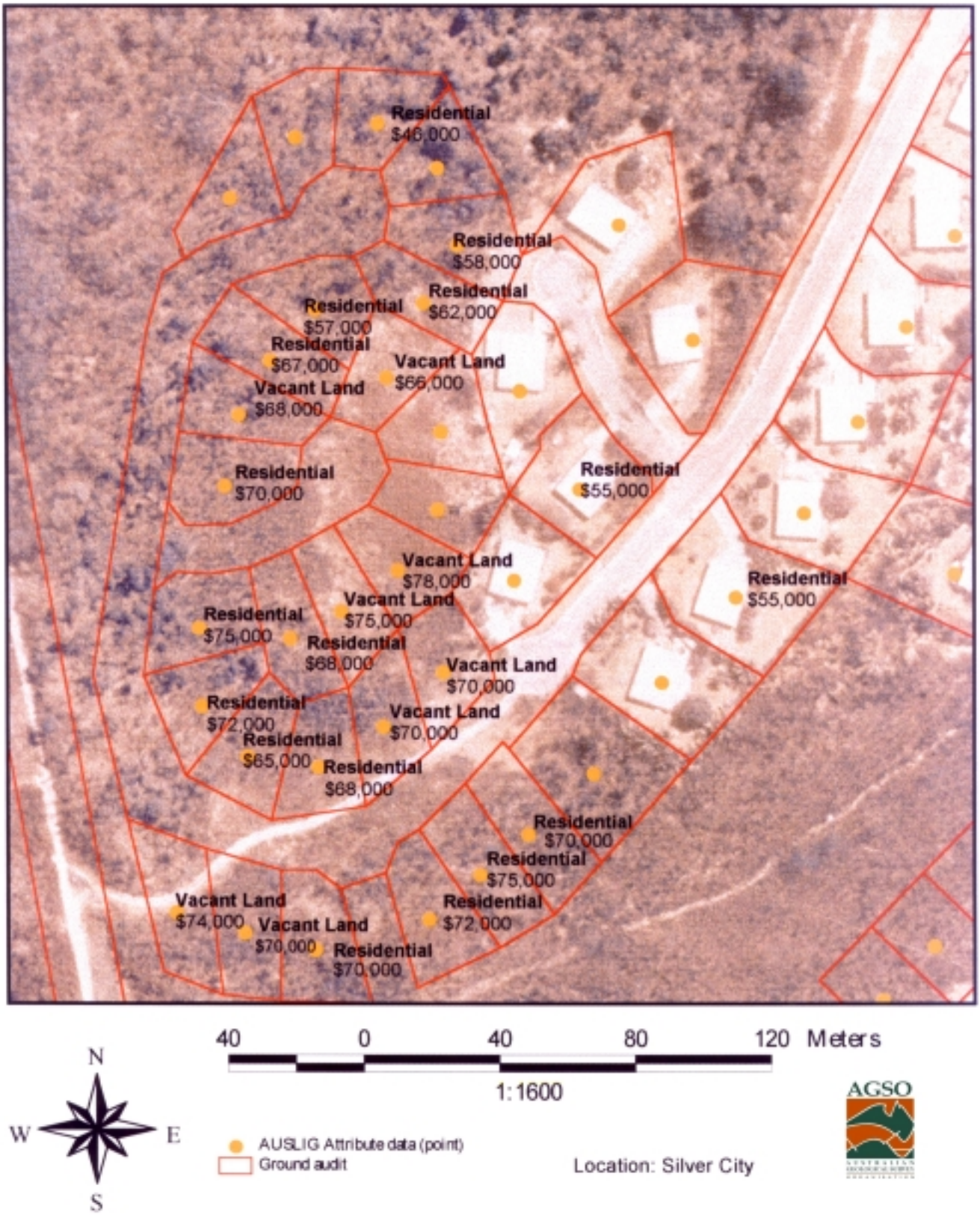


Fig. 11. Average Value of Residential Leases

CIGIS ground audit data: 'Current use' and 'Land value' fields.



Pin	Current Use	Improvements	Land value	Total val	Rental val
1096998	Residential	3 BR HOUSE Aluminium clad and roofed home approximate	0	160000	0
1128446	Residential	3 Bedroom HOUSE Hardiplank clad and metal deck roof.	62000	62000	0
1128447	Residential	Not applicable	57000	57000	0
1096993	Residential	3 BR HOUSE Aluminium clad and roofed home approximate	0	140000	0
1128448	Residential	Not applicable	67000	67000	0

APPENDIX 1

The following tables were taken from the documentation "Christmas Islands Lists" provided by AUSLIG, WA with the ground audit data. This was produced as part of the IOT audit of Christnas Island.

GLOSSARY OF ABBREVIATIONS

	An item to specify a type of organisation or individual ***L*** = Local Government ***Z*** = Commercial Organisation ***C*** = Commonwealth Government ***P*** = Private Person ***S*** = State Government
ADMIN	Christmas Island Administration
AGD	Attorney General's Department
AGS	Australian Government Solicitor
AUSLIG	Australian Surveying and Land Information Group
AVO	Australian Valuation Office
C/T	Certificate of Title
COUNCIL	Christmas Island Shire Council
Crown Lease No	Crown Lease Number
DOLA	Department of Land Administration
Grant No	An item to record Crown Grant number
Group Land Value	An item in the Valuation Table used to record the land value of several parcels that have been treated as one entity (Group) for valuation purposes
Group Improvements Value	An item in the Valuation Table used to record the value of improvements occupying several parcels and treated as one entity for valuation purposes
Group ID	An item in the Valuation Table used to identify a group of parcels that have been treated as one entity for valuation purposes
Land Record No	An item to record Crown Land Record Number
Land Status	An item to record Status of Crown Land: an entry of "***V Crown Land***" denotes a parcel that is Vacant Crown Land but not a Crown Allotment; an entry of "***Crown Lease***" denotes a Crown Allotment that is the subject of a Crown Lease.
Lease Type	An item in the Lease Table to record the type of lease agreement ***COM*** = Commercial lease ***RES*** = Residential lease
Reliability Date:	Information is correct to the date shown
SHIRE	Christmas Island Shire
Source Agency:	Name of organisation data has been obtained from.
Spatial Data	Data entities that are associated with their absolute or relative location
V CROWN LAND,	Vacant Crown Land
Valuation Method:	An item in the Valuation Table used to record the method used to value land and or improvements "***M***", market value "***R***", replacement value
VGO	Valuer General's Office

DATA SOURCES

Land information for the IOT Audit (Christmas Island) have been compiled from data supplied by the following organisations:

Department of Land Information	Cadastral information (Land Information Access Norm Files dated 26/10/95). Proposed reserves for Cocos.
Australian Valuation Office.	Valuation, land use and sites suitable for development.
Valuer General's Office	Valuation and land use.
Christmas Island Administration	Details regarding Commonwealth owned properties including: Properties managed by the Christmas Island Administration Commercial/Residential Leases; Properties to be vested in the Shire
Australian Government Solicitor	Application to bring land under the Transfer of land Act (Land Tenure and Title Status Report, 1995)
Works Australia	Services: water, sewer, electricity, telephone.
Wheelans	Christmas Island Planning Scheme

APPENDIX 2

Matched Ground Audit Records

The following spreadsheet contains the Ground Audit records which matched up with the AUSLIG polygons. Listed are the important descriptive fields which are first displayed in the attribute table.

APPENDIX 3

Integration of the Ground Audit Data with the existing CIGIS Cadastral Data

The Ground Audit data was acquired and compiled in the form of an *Access v2.0* database file. This information was then exported directly from *Access v2.0* into an *Excel* spreadsheet format.

After checking the data field columns to ensure that the data was not truncated in the export process, the spreadsheet was then saved as a "*.dBF"* (database) file.

The file was moved into the GIS working directory and stored under D:\CIGIS\CADASTRE\GNDAUDIT\TEMP

A temporary project called GNDAUDIT.APR was created in *ArcView v2.1* and existing polygon and point data produced by AUSLIG and DOLA were imported from the main Cadastre project.

The GNDAUDIT.DBF database file was then opened up as a table in the *ArcView* GNDAUDIT.APR project.

A set of data points produced by AUSLIG were then displayed as another table and the ground audit data was matched up and attached to it by using the **Join** command, creating a virtual link between the tables.

The data was matched using a common field called **Pin**, which appears to be some sort of unique identification numbering system.

Note: There were **155** points which could not be matched using the **Pin** field. These are listed in the third appendix.

The next process was to **Create a new Shape file** consisting of the joined data tables in order to create a permanent version of the combined data, [allaus1.shp].

Then the AUSLIG polygons which were intersected by AUSLIG points were selected using the **Select by Theme** function and then the selected polygons were used to create another **new Shape file**, [allpoly1.shp].

The GNDAUDIT.APR project was then closed and a **new project** was started in order to focus on the new data. In the new project the new shape files were displayed in the **View** frame.

The polygon data was then spatially joined to the combined points and audit data using the common **Shape** field in the tables. The joined data was then saved as another new Shape File, [allaus2.shp]. This allowed the polygon information to be displayed when one of the AUSLIG points were selected with the Information Pointer.

The final stage involved joining the combined data file [allaus2.shp] to the complete polygon table (third original shape file). They were joined using the common field **Cpolycig_** and saved as another Shape file, [v3comp1]. This enabled all available information to be displayed when a polygon was selected or to high-light a polygon when a table record is selected, providing the '.SHP' table and not the '.dBF' is being used.

The new Shape file was then moved into a more permanent spot in the directory structure under D:\CIGIS\CADASTRE\GNDAUDIT and kept as an original version. The file was then copied as a new shape file twice in the process of producing the final table.

The data from the table was also exported using the **Export** command as a new DBF file for editing purposes and providing a sample print out in *Excel*.

Adapting Data for Statistical Use

Due to the way some of the data was entered in the data base tables, it is not always possible for the computer to recognise the data as numerical figures that can be used to create statistics.

This is usually due to the inclusion of symbols such as $ (costs/values) or 'ha' (hectares) in the data columns. The computer recognises these examples as text labels and not numerical values.

As mentioned before, information can be exported out of *ArcView* from tables. The data can be exported in the 'dBF' format which is readily useable in *Excel 5.*

The extra symbols are removed using the **Find/Replace** command under the **Edit** menu which immediately causes the programme to recognise the figures as numbers. This is all that is necessary if using only '.XLS' and '.ASC' file formats.

For purposes of using the data in *ArcView,* the information has to be saved again in the '.dBF' format. One technical problem discovered through the course of correcting the data which caused a lot of frustration is that unless all the records in a field contain a number, the data will be treated as text labels or descriptions. All the blank spaces have to be filled with a figure such as zero, even if unknown.

Editing Database Tables

A brief word on editing database tables. When a new theme is created in the form of a Shape File there are actually three new files created. All contain the same prefix name, eg 'V3COMP1'. The three suffixes are 'SHP' (shape file), 'DBF' (database file) and 'SHX' (file attributes?).

The really important note is that the three files are all linked by spatial joins and if you start editing one of these tables you are going to affect all three files. There is a high risk of corrupting the data in some form, usually by confusing or displacing the links between the files. In other words, keep the original data and experiment with separate 'test' Shape files and exported data tables.

APPENDIX 4

The contents of this appendix are copied across from the System Documentation for ease of reference. The contents cover the information sources and the processes involved in compiling the cadastral information for use.

AUSLIG Cadastral Data

Format of Data as Supplied

Data was supplied by AUSLIG on a 3 1/4 inch diskette, containing the significant files as '.e00' extension. This allowed importing into Arc/Info using the Arc import command. The AUSLIG data was originally supplied by DOLA in the mid-1980's and has been processed further to match the same AUSLIG control as used for AUSLIG orthophotos. A version of the AUSLIG data was also supplied in dgn format. This was probably the original data prior to reworking by AUSLIG. A 'ppar.txt' file was also supplied, which contained coordinate data for the centroid of each polygon (land parcel).

Method of Conversion of Data

AUSLIG Coordinate Data:

Initially, the 'ppar.txt' file was imported into Microsoft Excel. Once the parsing in Microsoft Excel had been completed, the files were then saved in the native Excel format (xls extension).

Upon examination of the data, the CNTRDLATEA field contained coordinate values that would result in the points being displayed in the wrong hemisphere. To overt this situation, a column was added in excel, in which the following calculation was conducted to ensure that the correct coordinate values could be used after this process.

Newlatea = cntrdlatea x -1

The file was then saved again in the native excel format, and then exported in dbf format, to provide a format favourable for use in the CIGIS. This method was found to be the best way of creating a new field with the correct latitude values. This procedure created errors when carried out in ArcView version 2.1.

As many of the records (229) in this table contained a coordinate of zero in both the x and y directions, these records yielded false data. To overcome this error, all the non-zero coordinate pairs were selected for display using the add event theme selection from the view menu in ArcView.

Strange results appeared when the table was exported to '.dbf' format. Whilst all of the field headings remained, all of the data was removed from the table, resulting in all records having both x and y coordinates of 0.

With the aim of finding a successful technique for attaching the attribute data to the property boundaries, the table was then converted to a shape file. This was then exported in 'dbf' format. The resultant table in dbf format was converted to a shape file again.

Following this round about method, the Arc command shapearc was used. This resultant file (newppar.txt) was then added to an ArcView view for verification. As this yielded more usuable points than the original DOLA version, this table was used as described in the next section.

DOLA Attribute Data:

The remainder of the attribute data required for this task was taken from the DOLA data, which was processed at an earlier stage by the method described under the DOLA Cadastral Data chapter.

The individual files in dbf format were loaded as tables in ArcView version 2.1 for joining. The following steps were taken to join all the necessary files:

1. Join 'cadline.dbf' to 'polyline.dbf' on LINNO.
2. Rename resultant table to 'ausldata.jn'
3. Join 'register.dbf' to 'propriet.dbf' on REGNO
4. Rename resultant table to 'newprop.jn'
5. Export 'newprop.jn' in 'dbf' format
6. Join 'unit.dbf' to 'strata.dbf' on STRATNO
7. Rename resultant table to 'newstra.jn'
8. Export 'newstra.jn' in 'dbf' format
9. Join 'newppar.dbf' to 'ausldata.jn' on PIN
10. Join 'newprop.dbf' to 'ausldata.jn' on PIN
11. Join 'newstra.dbf' to 'ausldata.jn' on PIN
12. Join 'polyparreg.dbf' to 'ausldata.jn' on REGNO

Once all joins are completed, 'ausldata.jn' was exported in 'dbf' format. All the original 'dbf' files were removed and the 'ausldata.dbf' file was added. The required fields were then moved so that the most useful were to the left of the table, with the unwanted fields

being deleted from the table. The spatial component was added using the add event theme selections from the view menu, using the CNTRDLONOR and the NEWLATEA fields as coordinates. This was then converted to a shape file from the theme menu. To create an arc coverage, the Arc command shapearc was used, with the outcover being named 'attdata'. As the data was not in the correct projection, it was re-projected in ArcInfo using the project command. Firstly 'attdata' was projected into UTM (attdautm) and then to CIG85 (attdacig).

AUSLIG Polygon Data:

To convert the reworked AUSLIG data into a useable format, the following macro was run in Arc/Info. The following macro creates the properties as polygons, as well as the boundaries as arcs.

```
&echo &on
import auto dolacad.e00 dolacad
import auto dola_cig.e00 dola_cig
clean dolacad # # 0.000000001 poly
build dolacad poly
index dolacad poly
build dola_cig poly
index dola_cig poly
igdsarc dolacad.dgn auscad
$rest
y
clean auscad auscadcl # 0.000000001 poly
index auscadcl poly
```

Verification of the Data

ArcView version 2.1 was used for verification of the data, with a project ('xmasatt.apr') being created. The original DOLA polygon centroid data was added as a theme, for comparison with the AUSLIG reworked polygon centroid data. It was discovered that the AUSLIG reworked data was much more complete, containing approximately 300 more points.

The original DOLA polygon and line coverages were added as individual themes to the 'datachk.apr' project. Also added was the reworked AUSLIG polygon and line coverages as well as the original AUSLIG polygon coverage, once again, each as an individual theme.

By loading each of the coverages as separate themes, and laying them over the background orthophotographs, the difference between the location of the polygon centroids and the property boundaries and the actual boundaries from the orthophotos could be determined. This is best done by switching each of the themes on and off to compare the differences.

After closer examination of the data, one will notice that not all polygons have complete records in the attribute table. In many cases, the polygon does not have a owner's name or property name in the attribute table. As many tables have been joined to create this final table ('attdacig') many records may have been clipped along the way. The aim of the joins was to preserve the polygon centroid points, regardless of the other data.

To determine how many record contained all the property owner's names as well as coordinates for the polygon centroid, a table was created with the join preserving owner's names over any other data. Only 68 points were produced using this method.

The final method was that which yielded all points, some with property owner's names.

Final Format of Data

The final format of all data was an ArcView shape file. All other Arc/Info coverages were deleted to limit disk storage space.

‘Cadastre’ Directory

Description

The cadastre directory contains an array of file sources from Australian Surveying & Land Information Group, Canberra (AUSLIG) and the Department Of Land Administration, Western Australia (DOLA). Data was received in various formats and on various mediums, which led to more tedious conversion work.

The data sourced from AUSLIG was DOLA data, on which much time and effort had been spent reworking the data to yield more useable information.

The data received from DOLA seemed to lack many records in the table which was used to link the attribute data to the coordinate data, which resulted in many of the records having entries in only a few fields.

Accuracy

By overlaying the final cadastre dataset on the orthophoto, comparison can be made as to how the polygons fit in with the land parcels. Using this method, the accuracy is reasonable even at very large scales. It is recommended, however, that the data should not be viewed at scales of less than 1:2000, as beyond this, accuracy may become unacceptable.

The cadastral data provided in the CIGIS is for use as an spatial data analysis tool, and should in no way be used to make legal decisions in cases such as property boundary disputes.

Data Source

The data used in the production of the final cadastral dataset was from two sources. The polygon data was obtained from AUSLIG, who reworked the data, originally supplied by DOLA. This is the most complete set of the polygon cadastre data found by MREB. The attribute data is that supplied by DOLA in their NORM format in various tables.

The AUSLIG spatial data, including a reworked version of a table containing the polygon centroid coordinates was supplied in a CIG85 projection. All other data was supplied in a UTM projection.

All cadastre attribute data was supplied in ASCII format, with the spatial components supplied in ‘.dgn’ format. A data listing of the source data is available at Appendix 1.

Manipulation of Data

Much work was carried out by MREB on both the AUSLIG and DOLA data to create a final useable cadastre dataset. Basically, the tables were joined on various fields, and then finally joined to the AUSLIG supplied 'ppar.txt' file which contained coordinates for the polygon centroids. This allowed the display of the attribute data. A more detailed description of the steps and processes undertaken can be found under the relevant sections in Appendix 1.

Final Product

The final product is composed of a number of files from various sources. Primarily, the attribute data was from DOLA, with the exception of the table containing the polygon centroid coordinates, which allow the attributes to be displayed spatially. The most complete property boundary dataset was found to be created from 'dola_cig.e00', source from AUSLIG.

The final product is an ArcView version 2.1 project which contains all the relevant attribute data displayed via the polygon centroids, the property boundaries as polygons, with some underlying orthophotos for comparison.

The following image is a sample of the cadastral data contained in the Christmas Island Geographic Information System (CIGIS).

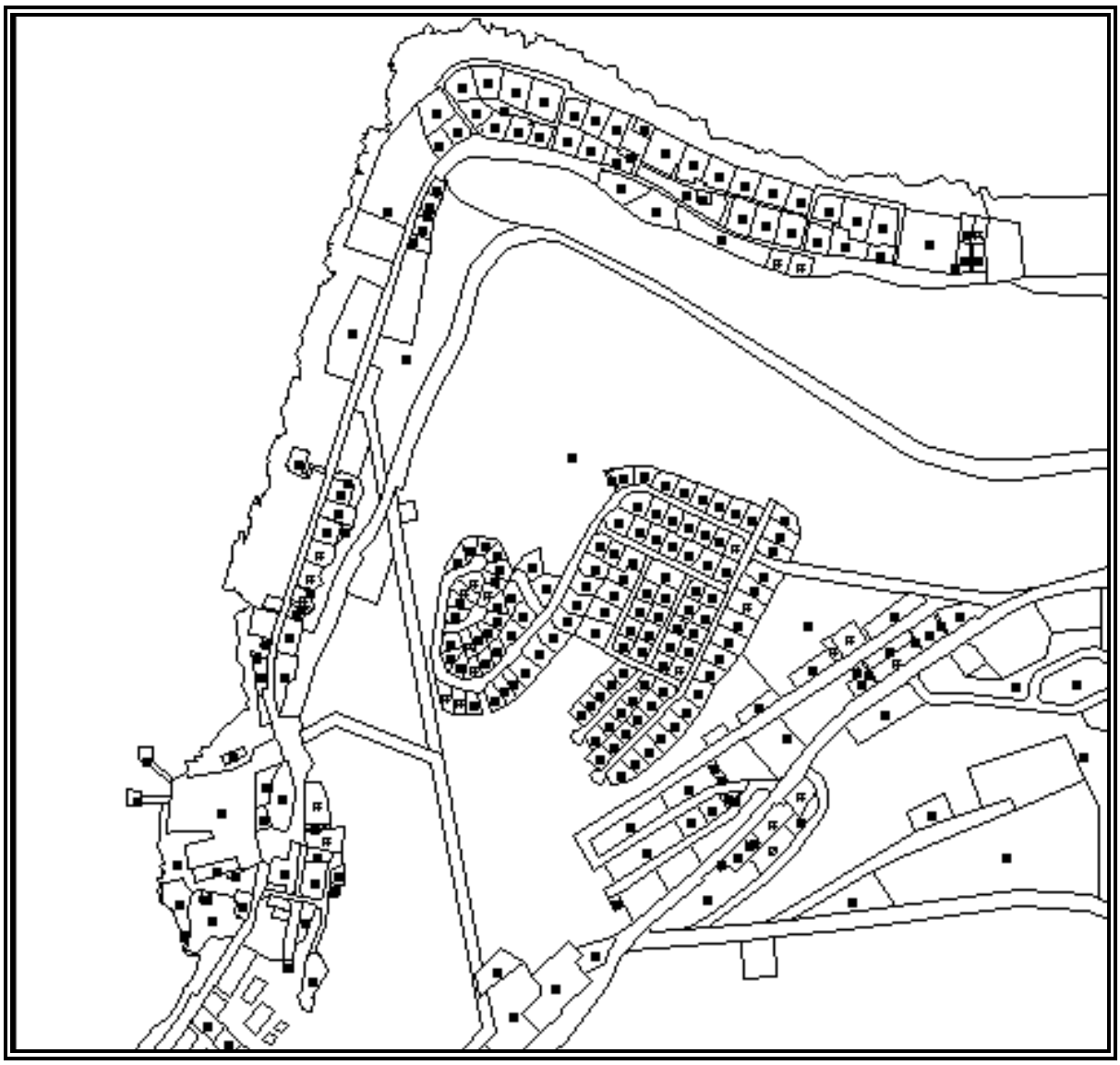


Fig. 12. Sample of CIGIS Cadastral Data (NE Corner)

In the above diagram, the small filled squares are the polygon centroids. Those centroids which are speckled in appearance are those containing an owner's name in the 'persname' field of the attribute table. The black centroids do not contain any data in this field. This is due to a non-complete dataset.

APPENDIX 5

UNMATCHED GROUND AUDIT DATA

The following records could not be matched up with the AUSLIG point data table because they had 3 or 4 digit PIN numbers whereas the records which matched up had 7 digit PIN numbers.

APPENDIX 6

LIA NORM FILE UPDATE

The following independant documentation is about the Land Information Access system (LIA) developed by DOLA.

Included in this appendix is the Norm file dictionary which was stored as a separate document file.

APPENDIX 7

Cadastral Data Listing

The following pages contain a listing of all supplied DOLA files in .dat format as well as files supplied by AUSLIG in various formats. Also included is a listing of all .dbf files used, after conversion from the original supplied data in their various formats.

DOLA Source Data:

All attribute data supplied by DOLA was in .dat format. The following is a listing of the original files supplied:

Directory of \CADASTRE\DOLA\SOURCE

Name:	Size:	Date:	Time:
ADDRESS.DAT	6,164	17/01/97	8:31
ANGLE.DAT	0	17/01/97	8:31
ASSESSME.DAT	0	17/01/97	8:31
AZIMUTH.DAT	0	17/01/97	8:31
CADLINE.DAT	118,580	17/01/97	8:31
CADPOINT.DAT	151,741	17/01/97	8:31
CADPOLY.DAT	23,568	17/01/97	8:31
CARC.DAT	790	17/01/97	8:31
COORDMTH.DAT	0	17/01/97	8:31
DISTRICT.DAT	0	17/01/97	8:31
FAMILY.DAT	0	17/01/97	8:31
GOVERNME.DAT	0	17/01/97	8:31
LANDUSE.DAT	0	17/01/97	8:31
LINE.DAT	232,925	17/01/97	8:31
LINEFAM.DAT	156,695	17/01/97	8:31
LINELEVE.DAT	0	17/01/97	8:31
LINESVY.DAT	0	17/01/97	8:31
POINT.DAT	235,587	17/01/97	8:31
POINTFAM.DAT	135,762	17/01/97	8:31
POINTLEV.DAT	0	17/01/97	8:31
POINTNAM.DAT	0	17/01/97	8:31
POLYFAM.DAT	16,694	17/01/97	8:31
POLYGON.DAT	47,627	17/01/97	8:31
POLYLEVE.DAT	0	17/01/97	8:31
POLYLIN.DAT	267,267	17/01/97	8:31
POLYMAP.DAT	0	17/01/97	8:31
POLYPAR.DAT	88,883	07/02/97	10:52
POLYPARR.DAT	20,603	07/02/97	10:42
POLYSVY.DAT	0	17/01/97	8:31
PROPRIET.DAT	78,302	17/01/97	8:31
REGISTER.DAT	24,120	17/01/97	8:31
RELATIVE.DAT	0	17/01/97	8:31
STPOINT.DAT	1,063,400	17/01/97	8:31
STRATA.DAT	5,909	17/01/97	8:31
SURVEY.DAT	0	17/01/97	8:31
UNIT.DAT	15,544	17/01/97	8:31

These files are in DOLA's 'NORM' format. A full descirption of each file can be gained form the DOLA Cadastral Data Dictionary.
As no file containing property boundaries as polygons was initially supplied, the following file was sent in dgn format:

Name:	Size:	Date:
DOLACDTR.DGN	429,095	29-01-97

Parsed DOLA Data:

The above '.dat' files were supplied by DOLA and were parsed through Microsoft Excel version 4.0 and saved as the native Excel format. These files were selected as they contained the attributes that were required for this project. After adding the column headers, in Excel, in accordance with the data dictionary, the files were exported in 'dbf' format. The files are as follows:

Directory of \CADASTRE\DOLA

Name:	Size:	Date:	Time:
CADLINE.DBF	292,505	12/02/97	12:30
POLYLIN.DBF	342,876	12/02/97	12:31
POLYPAR.DBF	167,096	24/01/97	12:12
POLYPARR.DBF	23,081	12/02/97	12:37
PROPRIET.DBF	64,084	12/02/97	12:29
REGISTER.DBF	29,170	12/02/97	12:43
STRATA.DBF	5,758	28/01/97	10:05
UNIT.DBF	15,234	12/02/97	12:26

The description of each of the above files is found in the table below. All data has been transformed from UTM(WGS84) to CIG85 projections. These descriptions are also available in the DOLA data dictionary.

File:	Description:
cadline.dbf	Cadastral line records
polylin.dbf	Polygon line records - links 'cadline.dbf' to other data
polypar.dbf	Polygon parcel records - contaqined cooridnates for polygon centroids
polyparr.dbf	Contains fields to link property attribute information with polygon centriod coordinates
propriet.dbf	Proprietor records from cadastral database
register.dbf	Register information (regno)

strata.dbf	Strata information - including addresses
unit.dbf	Unit record - lot number, entitlment etc.

AUSLIG Source Data:

Previously supplied AUSLIG data was available for comparison with the DOLA source data. This was data originally supplied by DOLA and has been reworked by AUSLIG to produce the following files:

Directory of \CADASTRE\AUSLIG\SOURCE

Name:	Size:	Date:	Time:
CHRISTMA.TXT	1,466	16/09/96	11:03
CIG_DQT.TXT	6,868	13/09/96	12:14
DOLA_CIG.E00	1,072,682	13/09/96	12:13
DOLACAD.DGN	119,296	12/09/96	16:15
DOLACAD.E00	971,927	13/09/96	12:12
DOLACAD.TXT	347	13/09/96	12:15
PPAR.TXT	100,474	12/09/96	11:39
IMPORT1.BAT	125	10/02/97	11:04

The desciption of each of the above files is found in the table below. All data has been transformed from UTM(WGS84) to CIG85 projections.

File:	Description:
gig_dgt.txt	data quality information
dolacad.txt	Description of MICROSTATION file dolacad.dgn.
ppar.txt	Polygon attribute file for DOLA Arc/Info export file dola_gig.e00.
dolacad.dgn	MICROSTATION dgn file of AUSLIG cadastral data with DOLA lot identifiers
dolacad.e00	Arc/Info export format of AUSLIG cadastral data
dola_cig.e00	Arc/info export format of transformed DOLA cadastral data.

DOLA_CIG.E00 and DOLACAD.e00 are both files which are in the required format for importing into Arc/Info using the Arc import command. DOLA_CIG.E00 is the property boundaries as arcs, whereas DOLACAD.e00 is same feature as polygons.

Source Data - File Listings:

The following pages are a listing of the original source data, from the various agencies, that were used to produce the finished product. The following files were not listed due to the following reasons:

ppar.txt - succeeded by newppar.dbf

dola_cig.e00- Arc/Info export format of AUSLIG cadastral data

dolacad.dgn - MICROSTATION dgn file of AUSLIG cadastral data with DOLA lot identifiers

dolacad.e00 - Arc/info export format of transformed DOLA cadastral data. Data has been transformed from WGS84 to CIG85

newppar.dbf - This file is not listed as it contains almost 7,000 records. The first page of the source data listing contains a subset of the record in this file.

APPENDIX 8

INVOICES, QUOTES AND OTHER DOCUMENTS

The following pages are copies of the of the quotes and costs involved in purchasing and collecting the cadastral data.